What is claimed is:

1. An anti-glare film having rough surface of which R (0) is 1% or less, and R (30 or more) / R (0) is 0.001 or less,

wherein R (0) is the regular reflectance along the regular reflection direction against incidence light at any angle from 5 to 30° from the normal line of said anti-glare film and

R (30 or more) is the reflectance against said incidence light, along a direction inclined by 30° or more toward said anti-glare film side from said normal reflection direction.

2. The anti-glare film according to Claim 1, wherein the 60° reflection definition is 200% or less.

3. The anti-glare film according to Claim 1 or 2, wherein

the roughness of the surface is divided into unit cells having a plurality of irregularities,

the irregularities constitute mutual translational symmetry with irregularities in other unit cells, and

the average value of minimum distances between peaks of said irregularities (m_1) and the standard deviation of said minimum distances (σ_1) in said unit cells, satisfies

the following formula:

$$0.05 \leqq \sigma_1/m_1 \leqq 0.3$$

4. A method of producing an anti-glare film according to any of Claim 1, comprising

a step of performing gradient exposure on a photo-resist formed on a base material, a step of conducting development on to form roughness on said photo-resist,

a step of electro-casting a metal on said photo-resist,

a step of peeling said metal from said photo-resist to produce a metal plate transferred the roughness, and

a step of transferring said roughness onto a film using said metal plate.

5. The method of producing an anti-glare film according to Claim 4, wherein

the step of transferring said roughness comprises a step of winding said metal plate on the surface of a roll to produce an emboss roll having said roughness on its surface, and a step of continuously transferring said roughness onto a film using said emboss roll.

6. The method of producing an anti-glare film

according to Claim 4 or 5, wherein

the step of performing gradient exposure is conducted by performing proximity exposure at least via a photo-mask of two gradients on said photo-resist, and

the distance between said photo-mask and said photo-resist (L μm) and the outer dimension of transmission portions of said photo-mask (D μm) satisfys the following formula:

$$1.3 \leqq L/D^2 \leqq 2.8$$

7. The method of producing an anti-glare film according to Claim 4 or 5, wherein the step of performing gradient exposure is conducted at least via a photo-mask of multi gradients on said photo-resist.

8. The method of producing an anti-glare film according to Claim 4 or 5, wherein the step of performing gradient exposure is conducted by using a space light modulation element capable of changing the light intensity of an exposure light source with at least the location on said photo-resist.

9. A display equipped with an anti-glare film according to Claim 1.

ANTI-GLARE FILM, METHOD OF PRODUCING THE SAME, AND DISPLAY EQUIPPED WITH THE SAME

Abstract

The present invention provides an anti-glare film having rough surface of which R (0) and R (30 or more) / R (0) are 1% or less and 0.001 or less, respectively,

wherein R (0) is if the regular reflectance along the regular reflection direction against incidence light at any angle from 5 to 30° from the normal line of said anti-glare film and

R (30 or more) is the reflectance against said incidence light, along a direction inclined by 30° or more toward said anti-glare film side from said normal reflection direction. And the present invention also provides the method of producing the above-mentioned anti-glare film.